

REMARKS

In the Final Office Action mailed January 10, 2006, the Examiner rejected claims 10-13 and 16-22 under 35 U.S.C. § 101, rejected claims 1-9, 10-13 and 18 under 35 U.S.C. § 112, rejected claims 1-13 and 16-22 under 35 U.S.C. §§ 102 and 103. In this response, Applicants have amended the specification, amended claims 1, 9, 10-13, 16, 18 and 21, added new claims 23-28. Upon entry of the amendments, claims 1-13 and 16-28 are pending in the application. Accordingly, reconsideration of the rejections and allowance of the pending claims is respectfully requested.

Amendment to the Specification

In the present response, Applicants have amended the text in a paragraph on page 1, lines 5-6. This amendment merely includes a reference to a co-pending application previously identified to the Examiner, which also claims priority to the same provisional application relied upon by the current application. As the amendment does not add any new matter, Applicants respectfully request entry of the amendment.

Rejections under 35 U.S.C. § 101

In the Official Action, the Examiner rejected claims 10-13 and 16-22 under 35 U.S.C. § 101, as being directed to non-statutory subject matter. In particular, the Examiner stated that the claims 10, 13 and 16 fail to produce a tangible result. Applicants respectfully traverse the rejection.

To begin, various safe harbors are described in the M.P.E.P. for method claims. In particular, under M.P.E.P. §2106(IV)(B)(2)(b)(ii), what is determinative is not how the process is performed, but whether the process is directed to a practical application. *Arrhythmia Research Technology Inc. v. Corazonix Corp.*, 22 U.S.P.Q.2d 1033, 1036 (Fed. Cir. 1992). For such subject matter to be statutory, a claim is limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result; i.e., the method recites a step or act of producing something that is concrete, tangible and useful. *AT&T Corp. v. Excel Communications Inc.*, 50 U.S.P.Q.2d 1447, 1452, 1453 (Fed. Cir. 1999). For example, a claimed process for digitally filtering noise employing the mathematical algorithm or transformation of electrocardiograph signals is statutory. Further,

the transformation of data representing discrete dollar amounts is a practical application, even though the claim specifies that nothing was done with the computed data outside the machine. *Ex parte Lundgren*, 76 U.S.P.Q.2d 1385, 1398, 1411, 1412 (Bd. Pat. App. & Int. 2005). Thus

Although Applicants believe that *Ex parte Lundgren* makes it clear that performing a method on a computer does not confer patentability, Applicants have amended independent claims 10, 13 and 16 to further clarify the claimed subject matter. As amended, claims 10-13 and 16-22 are directed to methods of either simulating transport phenomena in a physical system or modeling a hydrocarbon system. These amendments are supported by the present application and drawings and are not believed to add any new matter. *See e.g.* Application, pages 17-22. It should be noted that these methods are believed to be statutory methods associated with a practical application, which is the simulation of transport phenomena through a physical system. That is, the simulation of the transport phenomena through a physical system is believed to be a tangible result. Thus, each of these claims accomplishes a practical application that produces a "useful, concrete and tangible result." Accordingly, Applicants respectfully request entry of the amendments and withdrawal of the rejection.

First Rejection under 35 U.S.C. § 112

The Examiner rejected claims 1-9 and 13 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. In particular, the Examiner asserted that the limitation of "the extensible class hierarchy permitting the addition of additional object types and additional member variables without any modifications to the class hierarchy itself," as recited in claim 1, prevents a person of ordinary skill in the art from making and using the invention. *See* Final Office Action, pages 4-9. Applicants respectfully traverse the rejection.

As previously discussed, Applicants again submit that the present application complies with the current, well-established legal principals related to enablement and that the Examiner has not satisfied the requirements set forth within the M.P.E.P. § 2164.01(a) for establishing an enablement rejection for at least the reasons presented in the previous response. However, to further prosecution, Applicants have included a Declaration from Stephen Netemeyer (herein referred to as "Declaration") to further support that the current application is adequately enabling, which is attached as an Exhibit. In the Declaration, Mr.

Netemeyer establishes that the specification and figures are sufficiently descriptive so as to enable one of ordinary skill in the art to make and/or use the invention. In particular, the Declaration includes a statement by Mr. Netemeyer that he is a person of ordinary skill in the art. Exhibit, para. 4. Mr. Netemeyer has acknowledged that the test for enablement is set forth as being whether one of ordinary skill in the art could make or use the invention from the disclosure in the patent coupled with information known in the art without undue experimentation. *See id.* at paras. 5 and 6. In view of this test, Mr. Netemeyer states that the current specification is sufficiently descriptive so as to enable one skilled in the art to make and/or use the invention. *See id.* at para. 7. These statements are clearly supported by at least the portions of the specification cited by Mr. Netemeyer.

Accordingly, Applicants respectfully submit that the specification of the present application clearly supports the claimed subject matter in terms that are believed to enable a person skilled in the art to which it pertains to make and/or use the same. Therefore, Applicants respectfully request withdrawal of the rejection.

Second and Third Rejection under 35 U.S.C. § 112

The Examiner rejected claims 10-12 and 18 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants have amended independent claim 10 to further clarify the claimed subject matter. Also, Applicants have amended claim 18 to clarify the scope of the claim, as suggested by the Examiner. These amendments are not believed to add any new matter. Thus, Applicants respectfully request entry of the amendments and withdrawal of the rejection.

Rejection of Claims 1-9 under 35 U.S.C. §§ 102 and 103

The Examiner rejected claims 1-9 under various combinations of prior art. For instance, the Examiner rejected claims 1, 8 and 9 under U.S.C. § 102 (b) as being anticipated by passages from "The C++ Programming Language, Third Edition" by Bjarne Stroustrup (1997), which is herein referred to as "Stroustrup." The Examiner rejected claims 2-5 under 35 U.S.C. § 103 (a) as being unpatentable over Stroustrup and U.S. Patent No. 6,038,389 to Rahon et al., which is herein referred to as "Rahon." The Examiner rejected claim 6 under 35 U.S.C. § 103 (a) as being unpatentable over Stroustrup and U.S. Patent No. 6,842,725 to

Sarda, which is herein referred to as "Sarda." The Examiner rejected claim 7 under 35 U.S.C. § 103 (a) as being unpatentable over Stroustrup and passages from "Design Patterns: Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides (1995), which is herein referred to as "Vlissides." Again, Applicants respectfully assert that the references, alone or in combination, do not disclose the claimed subject matter.

As noted in the previous response to the Office Action mailed July 18, 2005, Applicants respectfully note that the Stroustrup reference fails to disclose each of the recited features of independent claim 1. For example, Stroustrup fails to disclose an "extensible class hierarchy permitting the addition of additional object types and additional member variables without any modifications to the class hierarchy itself," as recited in claim 1. Claims 2-9 are believed to be patentable based on this dependence because the other references do not cure the deficiencies of Stroustrup. Second, the Rahon and Stroustrup references fail to disclose claimed subject matter, such as "wherein the transport phenomena comprises one or more of momentum, energy, and mass transport within a subsurface hydrocarbon-bearing reservoir and between the subsurface hydrocarbon-bearing reservoir and one or more delivery locations at the earth's surface," as recited in claim 2, "wherein the transport between a subsurface hydrocarbon-bearing reservoir and one or more of the delivery locations comprises one or more transport pathways, the transport pathways comprising at least one of production and injection well types and one or more facility types that are linked together to form a facility network through which hydrocarbon fluids are transported between the subsurface reservoir and the delivery locations," as recited in claim 3, "wherein the facility types contained within the transport pathways comprise at least one facility selected from surface flowlines, manifolds, separators, valves, pumps, and compressors," as recited in claim 4, and "wherein a text file (Data Definitions File) contains the definitions of the possible facility types that can be included in a simulation model and the definitions of the possible member variable types for each facility type," as recited in claim 5. Finally, the Examiner appears to have utilized hindsight reconstruction to pick and choose among isolated disclosures to teach the claimed subject matter. Hence, the cited references, alone or in combination, does not disclose or suggest the claimed subject matter.

Accordingly, in view of the remarks set forth above, Applicants respectfully submit that the Stroustrup reference cannot support a *prima facie* case of anticipation of claims 1, 8 and 9. Further, Applicants respectfully submit that the other cited references cannot support a *prima facie* case of obviousness for claims 2-7. Therefore, Applicants respectfully request the Examiner withdraw the rejection and allow the pending claims 1-9.

Rejection of claims 10-12 under 35 U.S.C. § 103

The Examiner rejected claims 10-12 under 35 U.S.C. § 103 (a) as being unpatentable over Sarda in view of Stroustrup. While Applicants have amended claims 10-12, Applicants respectfully assert that the Sarda and Stroustrup references do not disclose or teach the claimed subject matter.

In the rejection, the Examiner asserted that Sarda discloses all of the recited features except the software design of the method for modeling fluid flow. In an attempt to cure this deficiency, the Examiner relied on the Stroustrup reference to cure the deficiencies of the Sarda reference. Again, as noted in the previous response, Sarda does not provide or teach "building a model comprising a facility network, wherein the facility network comprises facility instances formed from facility types based on a first set of generic classes and member variable instances formed from member variables for the facility types based on a second set of generic classes, and wherein the first set and second set of generic classes are part of a class hierarchy that is not modified by the addition of other facility types and member variables," "using the facility instances and member variable instances in a mathematical simulation of transport phenomena within the facility network as a function of time" and "predicting the behavior of the facilities based on the mathematical simulation," as recited in claim 10. As such, Sarda fails to disclose the claimed subject matter of claim 10.

To begin, Sarda reference discloses the modeling of a well test in a fractured reservoir. *See* Sarda, col. 2, lines 8-17. In Sarda, a method of modeling fluid flows in the fractured multilayer porous medium by accounting for the real geometry of the fracture network and the local exchanges with the porous matrix is described. *See id.* at col. 2, lines 55-61. Clearly, Sarda does not provide or teach building a model having a facility network, much less, predicting the behavior of the facilities based on the mathematical simulation. As such, Sarda fails to disclose the claimed subject matter of claim 10.

Further, Stroustrup does not cure the deficiencies of Sarda. Stroustrup describes the C++ concept for creating built-in types to organize classes and take advantage of the relationships. *See* Stroustrup page 223. In particular, Stroustrup describes that inheritance may be utilized to represent the hierarchical relationships directly. *See* Stroustrup page 734. While Stroustrup describes classes having subclasses, it does not describe "the first set and second set of generic classes are part of a class hierarchy that is not modified by the addition of other facility types and member variables," as recited in claim 10. As such, Stroustrup fails to cure the deficiencies of Sarda.

Accordingly, in view of the remarks set forth above, Applicants respectfully submit that the Sarda and Stroustrup references cannot support a *prima facie* case of obviousness. Therefore, Applicants respectfully request that the Examiner withdraw the rejection and allow the pending claims 10-12.

Rejection of claim 13 under 35 U.S.C. § 103

The Examiner rejected claim 13 under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Patent No. 6,434,435 to Tubel et al., which is herein referred to as "Tubel," in view of Sarda and Stroustrup. Applicants respectfully assert that the Tubel, Sarda and Stroustrup references do not disclose or teach the claimed subject matter.

In the rejection of independent claim 13, the Examiner relied upon the Tubel reference to disclose all of the recited features except discretizing the reservoir into a plurality of volumetric cells, each modeled as nodes, and simulating the exchange of fluid between those nodes. In an attempt to cure these deficiencies, the Examiner relied upon the Sarda and Stroustrup references. However, Applicants respectfully note that Tubel, Sarda and Stroustrup fail to disclose each of the recited features of independent claim 13. For example, Tubel and Sarda fail to disclose "using facility instances and member variable instances of a class hierarchy to model the nodes and connections in the portion of the discretized model that represents wells and surface facilities of the physical system, wherein the class hierarchy comprises a first set of generic classes representing facility types utilized to create the facility instances and a second set of generic classes representing the member variables for the

facility types utilized to create the member variable instances, the class hierarchy permitting the addition of additional facility types and additional member variables without any modifications to the class hierarchy itself," as recited in claim 13. Hence, the Tubel, Sarda and Stroustrup references cannot render the claimed subject matter obvious.

As noted in the previous response, Tubel describes a process control optimization process for use with oilfield production management system. *See* Tubel; col. 1, lines 14-30 and col. 4, lines 5-10. Indeed, Tubel describes changing the class hierarchy. Similarly, as discussed above, Sarda reference discloses the modeling of a well test in a fractured reservoir. *See* Sarda, col. 2, lines 8-17. As such, Tubel and Sarda fail to disclose the claimed subject matter of claim 13.

Stroustrup fails to cure the deficiencies of the Tubel and Sarda references. Again, as discussed above, Stroustrup describes the C++ concept for creating built-in types to organize classes and take advantage of the relationships. *See* Stroustrup page 223. In particular, Stroustrup describes that inheritance may be utilized to represent the hierarchical relationships directly. *See* Stroustrup page 734. In Stroustrup, a broad method of modeling classes is described, but does not teach "using facility instances and member variable instances of a class hierarchy to model the nodes and connections in the portion of the discretized model that represents wells and surface facilities of the physical system, wherein the class hierarchy comprises a first set of generic classes representing facility types utilized to create the facility instances and a second set of generic classes representing the member variables for the facility types utilized to create the member variable instances, the class hierarchy permitting the addition of additional facility types and additional member variables without any modifications to the class hierarchy itself," as recited in claim 13. As such, Stroustrup fails to cure the deficiencies of Tubel and Sarda.

Accordingly, in view of the remarks set forth above, Applicants respectfully submit that the Tubel, Sarda and Stroustrup references cannot support a *prima facie* case of obviousness. Therefore, Applicants respectfully request that the Examiner withdraw the rejection and allow the pending claim 13.

Sixth Rejection under 35 U.S.C. § 103

The Examiner rejected claim 16-22 under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Patent No. 5,331,579 to Maguire, Jr. et al., which is herein referred to as "Maguire," in view of U.S. Patent No. 6,002,985 to Stephenson, which is herein referred to as "Stephenson." Applicants respectfully assert that the Maguire and Stephenson references do not disclose or teach the claimed subject matter.

In the rejection of independent claim 16, the Examiner relied upon the Maguire reference to disclose all of the recited features except Maguire is directed to a power plant rather than a hydrocarbon system. In an attempt to cure these deficiencies, the Examiner relied upon the Stephenson reference to disclose a hydrocarbon system and its associated components. However, Applicants respectfully note that Maguire and Stephenson fail to disclose each of the recited features of independent claim 16. For example, Maguire and Stephenson fail to disclose "accessing an application on a computer system having a first set of generic classes and a second set of generic classes associated in a class hierarchy," "providing facility types for a hydrocarbon facility network created from the first set of generic classes," and "providing member variables that are associated with at least one of the facility types and created from the second set of generic classes, wherein the facility types and the member variables do not modify the class hierarchy of the first set of generic classes and the second set of generic classes," as recited in claim 16. Finally, the Examiner appears to be relying on hindsight reconstruction as a basis for combining the reference. Hence, the Maguire and Stephenson references cannot render the claimed subject matter obvious.

With regard to the first point, the Maguire reference does not disclose "accessing an application on a computer system having a first set of generic classes and a second set of generic classes associated in a class hierarchy," "providing facility types for a hydrocarbon facility network created from the first set of generic classes," and "providing member variables that are associated with at least one of the facility types and created from the second set of generic classes, wherein the facility types and the member variables do not modify the class hierarchy of the first set of generic classes and the second set of generic classes," as recited in claim 16. In the rejection, the Examiner asserted that a certain passage of Maguire (col.5, line 41 to col. 6, line 35) discloses this claimed subject matter. However, in Maguire,

objects, which may represent a plant 36, system 32 or component 34, have a standard structure, which includes an object controller module 26, an object error checker module 28 and an object model module 30. *See* Maguire, col. 2, lines 12-27; col. 4, lines 60-63; col. 5, lines 8-30. As a result, to create the specific plant object 54, various objects 56 and 58 are configured as part of the plant object 54. *See* Fig. 2, col. 6, lines 19-24. The reference does not disclose using a first set of generic classes to create facility types and a second set of generic classes that create member variables, but uses a standard structure for all objects. As such, the Maguire reference fails to disclose this claimed subject matter.

While the Examiner did not specifically rely on Stephenson for the claimed subject matter, the reference fails to cure the deficiencies of the Maguire reference. The Stephenson reference discloses a method for controlling the development of an oil and gas reservoir. *See* Stephenson, col. 1, line 64 to col. 2, line 6. In Stephenson, a computer system may be used to model an oil and gas reservoir with a neural network topology to analysis the reservoir. *See id.* at col. 2, line 25 to col. 3, line 25. In particular, the Stephenson reference is directed to the use of a neural network topology to relate input parameters with output data in a computationally efficient method. *See id.* However, the reference does not appear to disclose or suggest using a first set of generic classes to create facility types and a second set of generic classes that create member variables. As such, Stephenson fails to cure the deficiencies of Maguire.

With regard to the second point, the Examiner appears to have relied upon hindsight reconstruction to reject the claimed subject matter. It should be noted that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). In the rejection, the Examiner stated that "Maguire teaches all but the intended use." However, as discussed above, the Maguire reference is simply directed to power plants and does not mention hydrocarbons, modeling a hydrocarbon system, much less using neural network technology in modeling. In Maguire, a user defines the objects that represent different pieces of equipment in a power plant. In contrast, the Stephenson reference is directed to a modeling approach that relies on neural network technology to generate meaningful outputs, which does not disclose the modeling of power plants or modeling of equipment within power plants. In Stephenson, the topology is defined by parameters

inputted into a computer system. *See* Stephenson, Abstract, col. 2, lines 12-60. Clearly, the Examiner is relying on the present application as the basis for combining these references. As such, the Examiner is impermissibly relying on the relying knowledge learned from the present application in selecting the proposed combination.

Accordingly, in view of the remarks set forth above, Applicants respectfully submit that the Maguire and Stephenson references cannot support a *prima facie* case of obviousness. Therefore, Applicants respectfully request that the Examiner withdraw the rejection and allow the pending claims 16-22.

New Claims 23-28

New claims 23-28 have been added in this response. Of these claims, only claim 24 is independent. Claim 24 sets forth a system in a manner similar to the recitations of claim 16. However, the recitations of claims 24-28 have been crafted to focus more on other aspects described in the specification. *See e.g.* Application; Figs. 2-7; page 7, line 17 to page 36, line 3. Accordingly, as claims 23-28 are clearly supported by the specification, these claims are believed to be clearly patentable at least for the reasons set forth above with respect to claims 16-22.

Fees

With regard to the claims and RCE, Applicants have added one independent claim along with five dependent claims. Accordingly, a fee of \$250 is believed to be required for the additional claims along with the fee of \$790 for the RCE. Accordingly, the Commissioner is authorized to charge the appropriate fees for the RCE and additional claims to the Deposit Account No. 05-1328. If this amount is in error or additional fees are required, the Commissioner is authorized to charge the appropriate fees to the deposit account noted above.

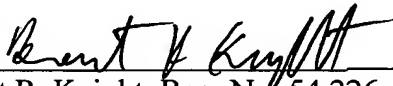
In addition, this is in response to the Final Office Action mailed on January 10, 2006. Applicant hereby requests a one month extension in the statutory period from April 10, 2006 to May 10, 2006 in accordance with 37 C.F.R. § 1.136. The Examiner is hereby authorized to charge the Deposit Account No. 05-1328 for the fee associated with this extension of time.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

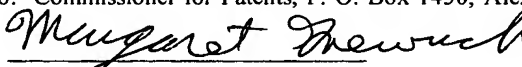
Respectfully submitted,

Date: March 10, 2006


Brent R. Knight, Reg. No. 54,226
ExxonMobil Upstream Research Company
P. O. Box 2189 (CORP-URC-SW 337)
Houston, TX 77252-2189
(713) 431-4563 Phone
(713) 431-4664 Fax

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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 on May 10, 2006.


Margaret Gnewuch